general floral morphology would seem to indicate a long-tongued pollinator, no such pollinators were observed visiting the flowers. More important, not a single fruit of this species matured on the research site during the entire course of the study. Several attempts to hand pollinate flowers yielded no fruit set. Lack of fruiting was attributed, at first, to the bird damage, but when cytological investigation was stymied another answer had to be sought. In spite of repeated attempts, with varied fixation schedules, no meiotic figures were obtained. Pollen stainability tests (cotton blue in lactophenol) were variably low on both fresh and herbarium material. It is our conjecture that meiosis proceeds properly to form fertile pollen only when certain environmental conditions, possibly pertaining to sunlight, are met. It is my estimate that five or more days of sunlight are necessary for proper pollen development: it should be noted that a half-dozen consecutive days of continuous sunshine would be a rare event on Pico del Oeste. The phenomenon of the correlation of weather (in contrast to climate) to a biological system is poorly known but an intimate relationship may be found to exist in this case. All indications point to irregular sexual reproduction in *Tabebuia rigida*, and further that the time lapse between periods of sexual reproduction may be of considerable length. In view of the semi-dominance of *T. rigida* on the Pico this consistent lack of sexual reproduction is of considerable import. The amount of vegetative reproduction is difficult to assay, and although it is not easy to propagate by cuttings under greenhouse conditions, the significance of vegetative reproduction cannot be underestimated.

The positive results of this portion of the investigation are presented below in tabular form. Voucher collection numbers (in italics) are given for all counts reported here for the first time, all of which are based on material from Pico del Oeste unless indicated otherwise in appropriate footnotes. Voucher specimens are deposited in the herbarium of the Arnold Arboretum (A). Where ranges of numbers are given these are not meant to be actual ranges but only an indication to assist future workers. No information about their chromosome numbers is known to me for those species which are not included in the following list.

GRAMINEAE

Ichnanthus pallens (Sw.) Munro. $2n = 40$ (*Nevling 347*)[2]

CYPERACEAE

Eleocharis yunquensis Britton. $2n = 10$ (*Howard & Nevling 15996*) [2]

ARACEAE

Anthurium dominicense Schott. $n = 15$ (*Howard 16179*) [2]

DIOSCOREACEAE

Rajania cordata L. $2n = 36$ [8]

ORCHIDACEAE

Dilomilis montana (Sw.) Summerhayes. $n = 21$ (*Nevling & Evans 131*) [2]

CHLORANTHACEAE

Hedyosmum arborescens Sw. $n = 8$ [3]; $2n = 16$ (*Howard & Nevling 15995*) [2]

MORACEAE

Cecropia peltata L. $n = 14$ (*Howard & Nevling 16934*)[2]; $2n = 26$ [4]; $2n = 28$ [5]

URTICACEAE

Pilea krugii Urban. $n = 12$ (*Evans 229*) [2]

Pilea yunquensis (Urban) Britt. & Wils. $2n = 24$ (*Howard & Nevling 15975*) [2]

LAURACEAE

Ocotea spathulata Mez. $n = 12$ (*Dodd & Appenzeller 25*) [2]

MELIACEAE

Trichilia pallida Sw. $2n = 48–52$ (*Nevling 348*) [2]

AQUIFOLIACEAE

Ilex sintenisii (Urb.) Britt. $n = 20$ (*Evans 139*) [2]

OCHNACEAE

Sauvagesia erecta L. $2n = 38$ (*Nevling 349*) [2]

THEACEAE

Cleyera albopunctata (Griseb.) Krug & Urb. $2n =$ ca. 25 (*Howard & Nevling 15960*) [2]

MELASTOMATACEAE

Mecranium amygdalinum (Desr.) C. Wright ex Sauv. $n = 12$ (*Howard & Nevling 15960*) [2]

Miconia foveolata Cogn. $n = 17$ (*Howard et al. 16164*) [2]

Miconia pachyphylla Cogn. $2n =$ ca. 34 (*Howard et al. 16178*) [2]

ERICACEAE

Gonocalyx portoricensis (Urb.) A. C. Smith. $n = 23$ or 24, $2n = 46$ or 48 (*Howard & Nevling 15958*) [2]

Hornemannia racemosa Vahl. $2n =$ ca. 38 (*Howard 16058*) [2]

MYRSINACEAE

Grammadenia sintenisii (Urb.) Mez. $n = 23$ (*Howard et al. 16158*) [2]

Wallenia yunquensis (Urb.) Mez. $n = 21$ (*Howard & Nevling 15959*) [2]

SYMPLOCACEAE

Symplocos micrantha Krug & Urb. $n = 12$ (*Evans 138*) [2]

OLEACEAE

Haenianthus salicifolius Griseb. var. *obovatus* (Krug & Urb.) Knobl. $n = 20$ (*Howard & Nevling 16933*) [2]

[2] Original count.

[3] RÜDENBERG, L. Documented chromosome numbers of plants. Madroño **17**: 117. 1963. [Source: near La Mina, Puerto Rico.]

[4] KRAUSE, O. Cytologische Studien bei den Urticales. Ber. Deutsch. Bot. Ges. **48**: 12, 13. 1930. [Source: unknown.]

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[8] MARTIN, F. W. & S. ORTIZ. New chromosome numbers in some *Dioscorea* spp. Cytologia **31**: 105–107. 1966. [Publication not seen.]

CONVOLVULACEAE

Ipomoea repanda Jacq. $n = 15$ (*Howard & Nevling 15511*)[2]; $2n = 30$ (*Howard & Nevling 16003*) [2]

GESNERIACEAE

Alloplectus ambiguus Urb. $n = 18$ [6]

Gesneria sintenisii Urb. $n = 7$ (*Dodd & Appenzeller 23*) [2]

ACANTHACEAE

Justicia martinsoniana Howard. $n = 14$ (*Evans 26*) [2]; $2n = 28$ (*Nevling 350*) [2]

RUBIACEAE

Psychotria guadalupensis (DC.) Howard. $n = 22$ (*Dodd & Appenzeller 19*) [2]

CAMPANULACEAE

Lobelia portoricensis (Vatke) Urb. $n = 7$ (*Howard & Nevling 15978*) [7]

COMPOSITAE

Mikania pachyphylla Urb. $n = 17–20$ (*Evans 50*) [2]; $2n = 34–38$ (*Howard & Nevling 15987*) [2]

Of the 51 genera of flowering plants represented on the research site, published chromosome counts are readily available for only 28 of them; for the remaining 23 genera I have not located published counts. The counts presented above represent the first definite counts, as far as I am aware, for the following genera: *Ichnanthus*, *Dilomilis*, *Ocotea*, *Sauvagesia*, *Mecranium*, *Miconia*, *Grammadenia*, *Wallenia*, and *Haenianthus*.

Previously published chromosome counts are available for only five of the species under investigation (cited in footnotes). In general, where published counts are available for other species of the same genera represented on the site and where a range of haploid numbers has been reported, our species tend to be on the low end of the range. This might be best illustrated by some examples: reported haploid numbers in *Eleocharis* are 5, 9, 10, 16, 18, 20, 23–*E. yunquensis* has a haploid number of 10; in *Anthurium* haploid numbers are 15, 16, 17, 22, 28, and multiples thereof–*A. dominicense* has a haploid number of 15; in *Pilea* haploid numbers are 12 or 24–our species are $n = 12$ and $2n = 24$ respectively; in *Ipomoea* the haploid numbers are 15 or multiples thereof–in *I. repanda* $n = 15$; in *Justicia* the haploid numbers are 13, 14, 15, 16, 17, and 19–in *J. martinsoniana* the haploid number is 14; in *Lobelia* haploid numbers are 7 or multiples–in *L. portoricensis* the haploid number is 7. There are four notable exceptions to this pattern. In *Ilex* ($n = 18$ or 20) and *Psychotria* ($n = 11$ or 22) our species have the larger number. The two other exceptions are *Gesneria* and *Symplocos* where I am reporting haploid numbers lower than those previously reported for either genus. There have been some speculations recently that plants growing under adverse or extreme conditions often have a high percentage of polyploid species. On the basis of our studies to date, our plants do not seem to fit this pattern. Considerable work remains to be done and it is only at the time of completion that a truly balanced opinion can be presented.

ARNOLD ARBORETUM and GRAY HERBARIUM
HARVARD UNIVERSITY

THE GENERA OF SENECIONEAE IN THE SOUTHEASTERN UNITED STATES [1]

BERYL SIMPSON VUILLEUMIER

Tribe SENECIONEAE Cassini, Jour. Phys. Chim. Hist. Nat. Arts **88**: 196. 1819.[2]

Subtribe **Senecioninae** Dumortier, Fl. Belg. Prodr. 65. 1827.

Involucre composed of either a single series of bracts or two series with the outer in the form of supernumerary bractlets [or in a few genera multiseriate]. Anthers terminally appendaged, truncate at the base, or with short auriculate tails. Style branches of perfect florets truncate, obtuse, penicillate, or with a conical appendage, often with a distinct crown of hairs at the base of the appendage, or the appendage more elongate and papillate.

The Senecioninae are the only subtribe of the Senecioneae (of four, Bentham & Hooker, or three, Hoffmann) represented in the southeastern United States. In our treatment it is necessary to deal not only with *Senecio* L., perhaps the largest genus of flowering plants, but also with several of the satellite groups surrounding it. Most of these segregates are small, but seem to form natural groups usually distinguishable by a number of characters (cf. *Ligularia* L., *Emilia* Cass., *Cacalia* L., *Gynura* Cass., *Cineraria* L., *Erechtites* Raf., *Kleinia* Miller). *Senecio* itself, and three of these groups, *Emilia, Cacalia,* and *Erechtites* occur in the southeastern United States.

Various authors have considered these assemblages either as subgenera or sections of *Senecio* or as distinct genera. Bentham & Hooker maintained *Gynura* and *Emilia* but united *Cacalia* with *Senecio*. Baillon con-

[1] Prepared for a generic flora of the southeastern United States, a project of the Arnold Arboretum made possible through the support of the National Science Foundation and under the direction of Carroll E. Wood, Jr. The scheme and terminology follow that outlined at the beginning of the series (Jour. Arnold Arb. **39**: 296–346. 1958). As in previous treatments, the area includes North and South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, and Louisiana.

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[2] The tribes of the Compositae in the southeastern United States have been treated by Solbrig (Jour. Arnold Arb. **44**: 436–461. 1963). The reader should consult this work for additional information (e.g., familial and tribal descriptions, notes, and references) not included here.

sidered *Cacalia*, *Erechtites*, *Gynura*, and *Emilia* to be sections of *Senecio*, whereas Hoffmann gave *Erechtites*, *Gynura*, and *Cacalia* generic status and made *Emilia* a subgenus of *Senecio*. Muschler, in his treatment of the African species of *Senecio*, placed *Gynura* and *Emilia* in synonymy, but Greenman, dealing with the North and Central American senecios, considered these two genera distinct from *Senecio*.

At present, the acceptance or rejection of these taxa as independent genera depends primarily on the weight given to stylar characters. Thus, the question is essentially one of rank rather than affinity. For clarification of the generic nomenclature, ease of discussion, and historical reasons (cf. Torrey & Gray, Fl. N. Am.; Gleason, New Britt. & Brown Illus. Fl. Northeast. U.S.; Fernald, Gray's Man., ed. 8; Small, Man. Southeast. Fl.) the segregates of *Senecio* in our area are treated here as genera. It is, however, fully realized that, with the exception of *Arnica* L., none of the genera included is clearly set off morphologically from *Senecio*, that they frequently show transitions to *Senecio* in different parts of their ranges, and that evolutionarily they represent imperfectly isolated offshoots from a senecionid stock.

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